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**PATENT APPLICATION
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**PRINTING DEVICE REPLACEABLE COMPONENT HAVING
MEMORY TO STORE DATA USED TO DEVELOP MARKETING
SOLUTIONS AND METHOD FOR USE**

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1 **PRINTING DEVICE REPLACEABLE COMPONENT HAVING**
2 **MEMORY TO STORE DATA USED TO DEVELOP MARKETING**
3 **SOLUTIONS AND METHOD FOR USE**

4 **TECHNICAL FIELD**

5 The systems and methods that are described herein relate generally to
6 managing data collected from printing devices. More particularly, the systems and
7 methods described herein relate to a printing device replaceable component with
8 memory that is used to store printing device data, which is ultimately used to
9 develop marketing solutions.

10 **BACKGROUND**

11 In a free market economy, where consumer markets are driven by
12 competition between providers of goods, a provider wishing to compete for
13 consumer business must make potential customers aware of the advantages and
14 benefits of the provider's product or service. Such a provider must rely on
15 effective marketing campaigns to educate potential customers about the product.

16 Designing an effective marketing campaign is necessarily limited by the
17 means of the provider to fund advertising. Since virtually all providers have
18 limited funds available for advertising, it is important to employ an advertising
19 strategy that is efficient as well as effective.

20 Identifying consumers of similar products who might use the provider's
21 product (the relevant market) and delivering a message about the product to as
22 many such consumers as possible is the goal of an advertising campaign. Indirect
23 marketing techniques - such as television commercials and magazine
24 advertisements - are methods through which a provider delivers one advertising
25

1 message that may reach many potential customers. While indirect marketing is
2 common, the most efficient delivery of an advertising message is through direct
3 marketing. With direct marketing, the provider delivers one advertising message
4 for each identified potential customer that the provider plans to reach. This makes
5 the most efficient use of the provider's funds spent on advertising.

6 For example, when a provider pays for a television commercial to advertise
7 his product, he cannot definitively know how many likely consumers of his
8 product he will reach with the advertisement. While the provider may rely on
9 statistics to determine how many people receive the message, it is impossible for
10 the provider to know how many people receiving the message are within the
11 relevant market and how many are not. Direct marketing has the advantage that
12 the provider can be assured that all the money being spent on advertising is going
13 to delivering the message to the consumers who are likely to be in the relevant
14 market.

15 Manufacturers of printing devices such as printers, fax machines, copiers,
16 etc., and replacement parts for such devices face the same marketing problems as
17 any other provider in a competitive market. However, such manufacturers have a
18 slight advantage in that, when a sale of such a device is made, one or more
19 replaceable components will inevitably be required for the device, such as toner
20 cartridges, drums, etc.

21 This knowledge provides an advantage to a manufacturer of such a product
22 in that it limits the scope of marketing solutions provided for certain products and
23 customers. However, it is desirable to narrow the marketing effort to an even
24 more focused group of potential customers for a particular product.
25

SUMMARY

The systems and methods for utilizing printing device data in a customer service center that are described herein provide improved ways in which a provider may gather information about potential customers so that marketing solutions may be developed that specifically target those potential customers.

It is noted that the systems and methods described herein may be applied with any type of product, such as a printing device, that utilizes replaceable components. Such products include, but are not limited to, printing devices, such as laser printer, ink jet printers, electro-thermographic printers, dry medium printers, ribbon printers, facsimile machines that utilizes any of the previously mentioned printing methods, copy machines that utilize such printing methods, and the like. Replaceable components for such printing devices include, but are not limited to, toner cartridges, ink cartridges, imager drums, fusers, and the like. For discussion purposes, the systems and methods described herein will refer to a laser printer and a toner cartridge, although it should be understood that the systems and methods may be utilized with any printing device and replaceable component for the printing device.

In an example of a customer purchasing a printer from a printer manufacturer, the initial data about the customer is received when the customer returns a registration card that contains personal information about the customer, information about the types of products used by the customer, and other similar information. A file or record for that customer is set up in a marketing database maintained by the manufacturer. In the future, replaceable components for the printer, such as toner cartridges, are sold and delivered to the customer. The replaceable components include a memory tag, which is used to record data from

1 the printer. When a toner cartridge is exhausted, the customer returns it to the
2 manufacturer for recycling. The manufacturer receives the cartridge, and the data
3 is retrieved from the memory tag on the toner cartridge and data is stored in the
4 marketing database. Appropriate links to other records that are related to the same
5 customer or a similar product are established with the new data.

6 The memory tag on the toner cartridge collects virtually any type of printer
7 data, such as the model number and serial number of the printer in which the
8 cartridge is used, page coverage data, duplex usage data, number of pages printed
9 by the printer, number of pages printed from the toner cartridges, etc. In addition
10 to this data, the manufacturer may also test returned cartridges that are suspected
11 of having faults or as part of a quality control measure. Data regarding reliability
12 or the toner cartridge can be gained by this type of testing and may be added to the
13 marketing database and linked to customers who use the same type of toner
14 cartridge. Appropriate solutions for unreliable products may then be marketed to
15 such customers.

16 Marketing solutions are also stored in the marketing database and linked to
17 the printer or, in some cases, to the customer. For example, certain product/usage
18 scenarios are developed that are determined to be optimum for certain marketing
19 solutions. Suppose that it has been found that under high use conditions, toner
20 cartridge 'A' experiences an unusually high number of problems. The marketing
21 database can be processed to find customers that use toner cartridge 'A' in high
22 usage situations. The manufacturer can then notify these customers that toner
23 cartridge 'B' is more reliable under the customers' usage situations.

24 With such a system in place, a manufacturer can collect usage data
25 retrieved from replaceable components returned to the manufacturer and use this

1 data to identify particular customers that may be in a situation that make them
2 more likely to purchase certain products produced by the manufacturer. The
3 customer is thereby more satisfied with the printer purchased from the
4 manufacturer and will more likely buy from the manufacturer again. A long-term
5 relationship between the customer and the manufacturer can be established, which
6 will result in increased sales to the customer.

7 8 **BRIEF DESCRIPTION OF THE DRAWINGS**

9 A more complete understanding of exemplary methods and arrangements
10 of the invention may be had by reference to the following detailed description
11 when taken in conjunction with the accompanying drawings wherein:

12 Fig. 1 is an illustration of a laser printer toner cartridge having integrated
13 memory.

14 Fig. 2 is a depiction of a system for utilizing printing device data with a
15 marketing center.

16 Fig. 3 is a representation of a marketing database that stores data retrieved
17 from memory of printing device replaceable components used in printing devices
18 owned by several customers.

19 Fig. 4 is a flow diagram depicting a method for retrieving data from toner
20 cartridge memory to store in a marketing database.

21 Fig. 5 is a flow diagram depicting a method for processing a marketing
22 database that contains data from memory of toner cartridges, to assist with a
23 marketing solution.
24
25

DETAILED DESCRIPTION

The invention is illustrated in the drawings as being implemented in a suitable computing environment. Although not required, the invention will be described in the general context of computer-executable instructions, such as program modules, to be executed by a computing device, such as a personal computer, a hand-held computer or portable electronic device. Generally, program modules include routines, programs, objects, components, data structures, etc., that perform particular tasks or implement particular abstract data types. Moreover, those skilled in the art will appreciate that the invention may be practiced with other computer system configurations, including multi-processor systems, microprocessor-based or programmable consumer electronics, network PCs, minicomputers, mainframe computers, and the like. The invention may also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

General reference is made herein to one or more printing device. As used herein, "printing device" means any electronic device having data communications and data storage capabilities, and functions to render printed characters on a print medium. A printing device may be a printer, fax machine, copier, plotter, and the like. The term "printer" includes, but is not limited to, laser printers, ink jet printers, dot matrix printers, dry medium printers, copiers, facsimile machines and plotters. Although specific examples may refer to one or more of these printers, such examples are not meant to limit the scope of the claims or the description, but are meant to provide a specific understanding of the described implementations.

Fig. 1 is an illustration of a toner cartridge 100 that for a laser printer (not shown). The toner cartridge 100 is particularly suited for the present invention and includes a housing 102 and a toner reservoir 104 that may be filled with laser printer toner. The toner cartridge 100 also includes a label 106 that contains information identifying the toner cartridge 100 to a user. The label 106 typically recites the name of the manufacturer, the model number of the cartridge, etc.

A memory tag 108 is located underneath the label 106 on the toner cartridge 100, although the memory tag 108 may be placed on the toner cartridge 100 at any location that may be practical for the purposes described herein. The memory tag 108 is preferably a radio frequency identification (RFID) memory tag. RFID memory tags and applications therefor are well known in the art. Further aspects of the RFID memory tag 108 will become clear as the discussion progresses.

Fig. 2 is a diagram of an aggregation of systems 200 configured to employ the methods described herein. The systems 200 include a customer enterprise 202 that employs a local area network 204. The local area network 204 includes several computers (not shown) and printing devices, namely, laser printer 206, laser printer 208 and plotter 210. The customer enterprise 202 also includes laser printer 212 and fax machine 214 that are not a part of the local area network 204.

Although the customer enterprise 202 is shown having a local area network 240 and stand-alone printing devices, 212, 214, it is noted that any configuration of computers and printing devices that comprises at least one printing device may suffice for the purposes of the present invention. For example, the customer enterprise 202 could be a single person utilizing a single printing device. Or, the customer enterprise 202 could be a large enterprise having hundreds of computers

1 and printing devices – networked and stand-alone. As the discussion progresses, it
2 will be understood how one or more printing devices in the customer enterprise
3 202 can be utilized with the described methods.

4 The group of systems 200 also includes a manufacturer enterprise 216 that
5 represents a manufacturer or vendor of printing devices and replaceable
6 components for printing devices. The manufacturer enterprise 216 (or
7 “manufacturer”) includes a recycling center 218 that receives depleted replaceable
8 components, such as toner cartridges, from customers for recycling. The
9 manufacturer 216 also includes a marketing center 220 that includes personnel and
10 equipment used to identify potential customers and direct marketing strategies. In
11 addition to connecting with customer via traditional communication means such as
12 by telephone, the marketing center 220 communicates with the Internet 221. The
13 marketing center 220 therefore can communicate with the customer enterprise 202
14 by way of the Internet 221.

15 The manufacturer enterprise has a quality control center 222 that receives
16 depleted toner cartridges and other replaceable components from the recycling
17 center 218 and customers having problems. Depleted replaceable components are
18 checked according to a schedule set by the manufacturer 216, such as every n^{th}
19 component, components that are suspected of having a higher than average defect
20 rate, etc.

21 The manufacturer enterprise 216 maintains a marketing database 224 that
22 stores customer information including, but not limited to, personal data,
23 demographic data, printing devices purchased by multiple customers, replaceable
24 components purchased by the customers, etc. In addition, the marketing database
25 224 stores usage information related to printing devices in which a customer

1 utilizes a replaceable component that is returned to the recycling center 218. The
2 quality control center 222 also stores findings related to testing of returned
3 components in the marketing database 224. For instance, if a certain toner
4 cartridge has been found to have a high rate of defects, that information might be
5 stored with information related to printers that utilize that certain toner cartridge,
6 which is ultimately linked with a customer who owns such a printer. The reason
7 for doing so will be discussed in greater detail below.

8 When a printing device is sold by the manufacturer 216 to the customer
9 enterprise 202 ("customer"), a registration or warranty card is included. The
10 customer 202 fills out a registration card 226 for each printing device purchased
11 by the customer 202. This information is stored in the marketing database 224 and
12 includes a customer identifier that uniquely identifies the customer, such as a
13 customer name or customer number. Thereafter, any information stored in the
14 marketing database 224 that is related to the customer 202, printing devices owned
15 by the customer 202, or replaceable components bought and/or returned by the
16 customer are linked to the customer 202 by the customer identifier.

17 The registration card 226 may contain a box that the customer checks if the
18 customer consents to receive future marketing information from the manufacturer
19 216. The marketing information may be advertisements for products that work
20 with a product currently owned by a customer, for products to replace a current
21 product owned by the customer, etc. The manufacturer 216 may desire to have the
22 customer's permission to send certain advertisements rather than alienating a
23 customer who does not desire to be on a marketing mailing list. Furthermore, a
24 customer's privacy can be protected by not linking the customer's personal
25

1 information with marketing solutions unless the customer has explicitly granted
2 permission for the manufacturer to do so.

3 As the customer 202 uses toner cartridges 228a-228c, ink cartridge 228d,
4 and other replaceable components (not shown), the cartridges 228a-228d are
5 returned to the recycling center 218 of the manufacturer enterprise 216. Each
6 cartridge 228a-228d includes a memory tag (Fig. 1, 108) integrated therewith or
7 affixed thereto. Usage data from each printing device 206-214 is recorded in the
8 memory of each cartridge 228a-228d as the printing device is operated with the
9 cartridge installed. The recycling center 218 retrieves this data and stores the data
10 in the marketing database 224. Thereafter, the cartridges 228a-228d may be sent
11 to the quality control center 222 for testing.

12 Fig. 3 is a representation of a marketing database 300 that is similar to the
13 marketing database 224 shown in Fig. 2. The marketing database 300 includes
14 multiple records, represented as record 302, record 304 and record 306. Although
15 only three records are shown, it should be understood that the marketing database
16 300 may have virtually any number of records. Also, for discussion purposes,
17 subsequent reference will be made only to record 302 as a matter of convenience.
18 It should be understood that any field included in record 302 is also included in
19 record 304, record 306 and any other record that may be included in the marketing
20 database 300.

21 Record 302 includes a printing device field 308, a printing device identifier
22 field 310, a customer identifier field 312, a quality control information field 314,
23 and a usage data field 316. Record 302 also includes a marketing solutions field
24 318, a components field 320 and a customer communications field 322. The fields
25

1 shown in record 302 are exemplary only and it should be noted that more or less
2 fields may be utilized to accomplish the purposes described herein.

3 The printing device field 308 contains a value that uniquely identifies a
4 type or model of a printing device. The printing device field 308 may contain a
5 numerical value (model number) or an alphanumerical value, such as the model
6 name of the printing device. As long as the value contained in the printing device
7 field 308 can be used to uniquely identify a printing device, any value may be
8 used.

9 The printing device identifier field 310 contains a value that uniquely
10 identifies a single printing device of the type or model identified in the printing
11 device field 308. Preferably, the printing device identifier field 310 contains the
12 serial number of a printing device.

13 The customer identifier field 312 contains a value that uniquely identifies a
14 customer. The value may be an alphanumeric value that represents a customer
15 name, or the value may be a numerical value, such as a customer number that is
16 assigned to the customer by the manufacturer. If a customer number is used, then
17 other means must be used that allow the customer's name to be identified from the
18 customer number.

19 The quality control information field 314 contains data collected by the
20 quality control center 222 through product testing, returned products, customer
21 complaints, etc., as to problems or defects seen in a particular product. For
22 example, suppose that the quality control center 222 has determined that a "Model
23 930" laser printer exhibits above average wear on its photoelectric drum when the
24 average page coverage printed from the printer exceeds 45%. This information
25 would be stored in the quality control information field 314 of any record that

1 contained a value for a "Model 930" laser printer in its printing device field. Later
2 discussion will focus on how this information may be used in a marketing
3 solution.

4 The usage data field 316 contains data retrieved from recycled replaceable
5 components that have been used in (and, therefore, have collected data from) the
6 printing device identified in the printing device identifier field 310. This
7 information may include, but is not limited to, a number of pages printed by the
8 printing device, percentage of black ink only jobs printed by the printing device,
9 percentage of printing jobs printed in duplex mode, etc. Any printing device data
10 that can be recorded and stored in the component memory of a replaceable
11 component used in the printing device may be retrieved from the component
12 memory and stored in the usage data field 316. Having access to this data helps to
13 identify printing devices and, ultimately, customers that may be able to use other
14 products offered by the manufacturer. Once such customers have been identified,
15 a manufacturer can provide information about these other products to the
16 customers.

17 The marketing solutions field 318 contains information that is used to
18 identify printing devices that meet certain criteria. The marketing solutions field
19 308 may only contain criteria for a printing device identified in the printing device
20 field 318 or the printing device identifier field 310. Additionally, the marketing
21 solutions field 318 may contain criteria related to components used in the
22 identified printing device. The components for a printing device identified in the
23 printing device field 308 or the printing device identifier field 310 are identified in
24 the components field 320. The components field 320 will be described in greater
25 detail below.

1 As an example, suppose a laser printer "Model 100" is identified in the
2 printing device field 308. Assume also that toner cartridges that have been used in
3 the laser printer have been received by the recycling center 218 and usage data
4 contained in the memory of those toner cartridges has been retrieved and stored in
5 the marketing database 300. The usage data stored in the usage data field 316 may
6 indicate that the number of pages printed by the laser printer in question is higher
7 than the rated duty cycle for the laser printer. The marketing solutions field 318
8 may contain criteria that indicate that if a Model 100 printer is used to print more
9 than x amount of pages in a month, then a printer with a higher duty cycle should
10 be marketing to the owner of the Model 100 laser printer.

11 As another example, if the quality control information field 314 indicates
12 that a toner cartridge designed for use in the Model 100 laser printer has been
13 found to exhibit a high rate of defects, the marketing solutions field 318 may
14 indicate that marketing information should be delivered to the customer who uses
15 the laser printer. This marketing information may include a notice that the
16 customer needs to start using a different toner cartridge, a coupon that the
17 customer can use to obtain a discount on the new toner cartridge, advertising for
18 the new toner cartridge and information about its superior performance, etc.

19 In one implementation, the criteria for determining when marketing should
20 be targeted to the owner of a particular printing device is contained in the
21 marketing solutions field 318. Every now and then, the database would be
22 processed to take the criteria in the marketing solutions field 318 and apply the
23 criteria to the information contained in the other fields. In an alternative
24 implementation, only the instructions for what is to be done in a marketing sense
25 is contained in the marketing solutions field 318. In that implementation, a query

1 containing particular criteria for which to search would be run on the marketing
2 database 300 whenever a database administration deems it to be appropriate.

3 The components field 320 contains information that identifies components
4 that are used in the printing device identified in the printing device field 308 or the
5 printing device identifier field 310. For instance, if a "Model 99" laser printer
6 uses a 290A toner cartridge, that information is listed in the components field 320.
7 It is noted that if the customer has only purchased components from the
8 manufacturer, those components are listed in the components field 320 and the
9 printing devices that utilize that component are identified in the printing device
10 field 308.

11 The customer communications field 322 information related to
12 communications with the customer that owns the identified printing device. This
13 information may be a log of telephone calls, e-mail messages, correspondence, etc.
14 This information can be used to evaluate the customer's attitude or likely attitude
15 for receiving marketing, such as telephone calls. If the customer has a had a
16 history of problems with a product, it may be decided that the customer wouldn't
17 be receptive to some kinds of marketing techniques. Virtually any information
18 related to the customer identified in the customer identification field 312 may be
19 stored in the customer communications field 322.

20 Fig. 4 is a flow diagram of one way in which the data retrieved from
21 recycled component memory may be utilized in a marketing program. Continuing
22 reference will be made to the elements and reference numerals of Figs. 1 - 3 in the
23 following discussion of Fig. 4 and Fig. 5.

24 At step 400, the manufacturer 216 sells a printer 206 (or some other
25 printing device or printing device replaceable component) to the customer 202.

1 The customer 202 completes a registration card 226 that is shipped with the printer
2 206 and returns the registration card 226 to the manufacturer 216 (step 402).
3 Alternatively, some manufacturers provide a way in which a customer can register
4 with the same information electronically, such as via the Internet. Any way in
5 which the customer presents registration information to the manufacturer may be
6 utilized. At step 404, the manufacturer 302 stores customer information from the
7 registration card 226 in the marketing database 224. The customer information
8 includes a printer identifier - such as a serial number - that uniquely identifies the
9 printer 206 within the marketing database 224. All subsequent information
10 entered into the marketing database 224 that is related to the printer 206 or a
11 replaceable component purchased for the printer 206 is associated with the printer
12 identifier.

13 At step 406, it is determined if the customer has agreed to allow the
14 manufacturer to send marketing information about other manufacturer products to
15 the customer. If so ("Yes, branch), step 406, then the printer identifier (serial
16 number) is linked to customer information in the customer identifier field 312 and
17 direct marketing is enabled. If, however, the customer does not authorize future
18 marketing communications ("No" branch, step 406), then the information is not
19 linked to the customer. One way that this can be done is simply to leave the
20 customer identifier field 312 empty.

21 The printer 206 employs a toner cartridge 100 (or other replaceable
22 component) that has a memory tag 108 affixed to the toner cartridge 100 or
23 integrated into the toner cartridge 100. As the printer 206 operates, information
24 related to the printer 206 and its usage is stored in the memory tag 108. This
25 information includes printer usage data that includes, but is not limited to, total

1 number of pages printed by the printer, number of pages printed from the toner
2 cartridge 100, average amount of coverage on a page printed by the printer 206,
3 percentage of print job that only use black ink, etc.

4 When the toner cartridge 100 runs out of toner, the customer 202 returns the
5 depleted toner cartridge 100 to the manufacturer 216 for recycling at step 410.
6 The recycling center 218 receives the toner cartridge 100 and, at step 412,
7 retrieves the data from the memory tag 108 of the toner cartridge 100 and stores
8 the data in the marketing database 224.

9 Fig. 5 is a flow diagram of a method for accessing the marketing database
10 224 to assist with identifying customers who meet certain criteria set forth by the
11 manufacturer, the criteria determining if the customer is one to whom marketing
12 information should be provided. At step 500, a marketing solution for a printer or
13 component is retrieved. The marketing solution is information that identifies a
14 situation that places a customer in a group to be targeted for specific marketing.
15 For example, a marketing solution may be for any customer owning a certain type
16 of laser printer and using more than one toner cartridge a month in the laser
17 printer, to market a high-yield toner cartridge to the customer, the high-yield toner
18 cartridge requiring replacement less frequently than the cartridge currently used by
19 the customer.

20 There are alternative implementations for storing the marketing solutions
21 information in the marketing database 224, 300. In a first implementation, the
22 marketing solutions field may contain the marketing actions that are to take place
23 if certain criteria are met for the printing device identified in the record. In such
24 an implementation, a query containing the criteria would be run on the marketing
25 database 224, 300. If the information in the record 302 matched the criteria set

1 forth in the query, then the information contained in the marketing solutions field
2 318 would be applied or executed. In addition, in one implementation, the actual
3 actions taken in response to identifying the printing device of the record 302
4 would also be stored in the marketing solutions field 318.

5 An alternative implementation for storing the marketing solutions
6 information in the marketing database 224, 300 is to store the search criteria with
7 the marketing actions to take place if the information in the record 302 meets the
8 criteria. In such a case, the marketing database 224, 300 would have to be
9 processed to apply criteria contained in the marketing solutions field 318 to the
10 data contained in the other fields of the record 302. In printing device identified as
11 meeting criteria stored in the marketing solutions field 318 would be subject to
12 marketing focus.

13 Notwithstanding which implementation is utilized, at step 502 the criteria is
14 compared with data that has been retrieved from the memory of toner cartridges
15 returned to the manufacturer. This is the information that is stored in the various
16 fields of the marketing database 300. At step 504, it is determined whether the
17 data collected from a printing device meets the criteria set forth in the marketing
18 solution. If it does not ("No" branch, step 504), then no further action is taken. If,
19 however, the data meets the criteria ("Yes" branch, step 504), then it is determined
20 if the customer who owns the identified printing device has authorized marketing
21 materials to be delivered (step 506). If there is no such authorization ("No"
22 branch, step 506), then no action is taken. If the customer has previously
23 authorized the manufacturer to deliver marketing materials ("Yes" branch, step
24 506), then the customer is identified at step 508 and the marketing solution is
25 applied at step 510. The application of the marketing solution is execution of the

1 marketing plan that has been determined to be applicable to a printing device
2 identified in the search. For example, a customer owning an identified printing
3 device may receive a direct mailing, an e-mail message, a telephone call, etc.
4

5 **Conclusion**

6 The systems and methods described herein provide convenient, efficient
7 ways for using data collected in memory of printing device replaceable
8 components to identify marketing groups. The marketing groups so identified are
9 a more focused potential customer group that has a higher likelihood of
10 responding positively to marketing efforts. The customer is provided with a more
11 satisfying ongoing relationship with the manufacturer since the manufacturer can
12 assist the customer in obtaining the right printing device or printing device
13 component for the way in which the customer uses a printing device.
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